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ASSIGNMENT BOOKLET 2B

SCN1285 Science 14

Module 2: Section 2 Assignment and Section 3 Assignment

FOR STUDENT USE ONLY

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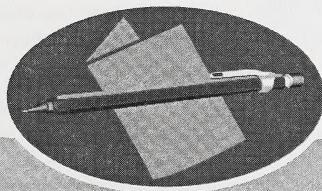
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Science 14

Module 2

Energy Transfer Technologies ASSIGNMENT BOOKLET 2B



**Learning
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Summary

	Total Possible Marks	Your Mark
Section 2 Assignment	35	
Section 3 Assignment	31	
	66	

Teacher's Comments

Science 14
 Module 2: Energy Transfer Technologies
 Assignment Booklet 2B
 Section 2 Assignment and Section 3 Assignment
 Learning Technologies Branch
 ISBN 0-7741-2513-6

The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Assignment Booklet.

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	



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ASSIGNMENT BOOKLET 2B
SCIENCE 14: MODULE 2
SECTION 2 ASSIGNMENT AND SECTION 3 ASSIGNMENT

Your mark for this module will be determined in part by how well you do your assignments.

This Assignment Booklet is worth 66 marks out of the total 116 marks for the assignments in Module 2. The value of each assignment and each question is stated in the left margin.

Work slowly and carefully. If you have difficulty, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

35

Section 2 Assignment: Controlling Heat Transfer

Read all parts of your assignment carefully and record your answers in the appropriate places.

For questions 1 to 8, read each question carefully. Decide which of the choices **BEST** completes the statement or answers the question. Place your answer in the blank space given.

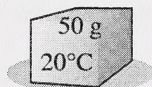
- ① _____ 1. Two identical jars are kept in a refrigerator. Jar A contains 250 mL of milk. Jar B contains 500 mL of milk. The jars are taken out of the refrigerator at the same time. Which jar will warm to room temperature first?
- A. Jar A
B. Jar B
C. Both jars will warm to room temperature at the same time.
D. Neither jar will ever warm to room temperature.
- ① _____ 2. Which reason **best** explains why sand is very hot on a hot day and water is cool?
- A. There is less sand than water, so it heats up quicker.
B. Sand has a higher specific heat capacity than water.
C. Water takes more energy to heat up than sand.
D. The sand is initially warmer.

- ① _____ 3. You boil one pot of water for vegetables on a stove and another pot of water for noodles. The pot for noodles contains twice as much water as the pot for vegetables. If the burners release exactly the same amount of heat, which of the following statements is **false**?
- A. The specific heat capacity of the water for the vegetables will be half of the specific heat capacity of the water for the noodles.
 - B. The water for the noodles will take twice as long to boil.
 - C. The burner the water for noodles is on will need to release twice as much energy as the burner with the water for the vegetables.
 - D. The water for the noodles will need twice the energy to boil as the water for vegetables.
- ① _____ 4. A beaker has 100 g of water. The amount of energy needed to raise the temperature of the water 5°C is approximately
- A. $420 \text{ J/g}\cdot^{\circ}\text{C}$
 - B. $210 \text{ J/g}\cdot^{\circ}\text{C}$
 - C. $2100 \text{ J/g}\cdot^{\circ}\text{C}$
 - D. $1000 \text{ J/g}\cdot^{\circ}\text{C}$
- ① _____ 5. Which of the following would require the least amount of heat to raise its temperature by 20°C ?
- A. 400 g of motor oil
 - B. 400 g of sand
 - C. 400 g of water
 - D. 400 g of iron
- ① _____ 6. Which type of heat transfer does fibreglass insulation in a dishwasher mainly stop?
- A. conduction
 - B. convection
 - C. radiation
 - D. reflection

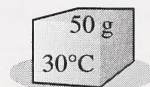
①

7. The following diagrams show four blocks of iron. Which block has the most thermal energy (heat)?

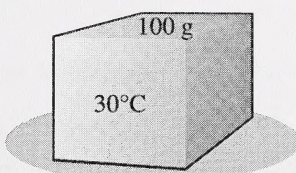
A.



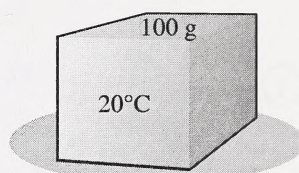
B.



C.



D.



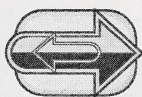
①

8. You need to raise each beaker's temperature 10°C. Which beaker needs the most heat to cause this temperature change?

- A. a beaker containing 400 mL of water at 20°C
- B. a beaker containing 400 mL of motor oil at 20°
- C. a beaker containing 800 mL of motor oil at 30°C
- D. a beaker containing 800 mL of water at 10°C

②

9. You need to cool a block of iron quickly. You have a large jug of water. You also have a large jug of motor oil. Which would cool the block faster? Why?



Return to page 50 of the Student Module Booklet and begin Lesson 2.

①

For questions 10 to 13, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

10. Mice generally stay warm under the snow in the winter because

- A. the ground does not freeze under the snow
- B. snow is a poor insulator
- C. snow is a good insulator
- D. the ground has a high specific heat capacity

- ① _____ 11. Why do wood shavings insulate better than solid wood?
- A. Wood shavings absorb moisture and, therefore, have a higher specific heat capacity.
 - B. Wood shavings have dead-air spaces that reduce heat transfer.
 - C. Wood shavings are lighter than wood.
 - D. Solid wood has a higher specific heat capacity.
- ① _____ 12. Which insulation would best keep a house warm in winter?
- A. 50 mm of wood shavings with an R-value of 4.84
 - B. 25 mm of fibreglass with an R-value of 4.25
 - C. 25 mm of rigid urethane foam with an R-value of 7.50
 - D. 25 mm of air space with a reflective surface with an R-value of 5.54
- ① _____ 13. Which of the following has the largest R-value? (Use the table of R-values on page 111 of the textbook.)
- A. 25 mm of air space with a reflective surface on the inside of the wall cavity
 - B. 50 mm of expanded polystyrene
 - C. 25 mm of fibreglass
 - D. 25 mm of rigid urethane foam
- ② 14. A wall cavity with a reflective surface has a higher R-value than just the cavity. Explain why this occurs.
- _____
- _____
- _____
- ③ 15. Your family is having a new house built. You want it to be energy efficient. Would you recommend small windows or large windows on its north side? Why?
- _____
- _____
- _____
- _____

16. Calculate the R-values for the following combinations of insulation. Show your work. (Use the table of R-values on page 111 of the textbook.)

④

- a. 25 mm of rigid urethane foam plus 12.5 mm of solid wood plus 100 mm of fibreglass

③

- b. 50 mm of rigid urethane foam plus 200 mm of concrete



Return to page 59 of the Student Module Booklet and begin Lesson 3.

For questions 17 to 22, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

①

_____ 17. Keeping warm on a cold day is best done by

- A. continuously moving
- B. wearing a heavy coat
- C. drinking hot liquids
- D. wearing several layers of clothing

①

_____ 18. Which of the following is **not** a characteristic of Caribou Inuit clothing?

- A. uses two layers
- B. is worn with fur next to the body
- C. has a nylon inner shell to make it windproof
- D. has a large hood to trap air in front of the wearer's face

①

_____ 19. An item that you would **not** include in a winter car survival kit is

- A. candle
- B. tin can
- C. sweater
- D. container of cold water

①

_____ 20. A danger that firefighters face even when fighting fires in the winter is

- A. heart attack
- B. heat stroke
- C. freezing their hands
- D. catching a cold

①

_____ 21. The reason an ocean diver's suit has a hood is

- A. to keep the diver's hair dry
- B. to prevent heat loss from the head
- C. so the diver does not get water in his or her ears
- D. to make the suit more attractive

①

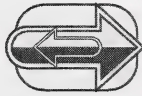
_____ 22. Diver's suits are made of

- A. neoprene with natural rubber mixed in
- B. neoprene with bubbles of oxygen trapped in the fabric
- C. neoprene with bubbles of nitrogen trapped in the fabric
- D. two layers of neoprene with nitrogen gas between

3

23. On a hot, sunny day in July, your car overheats in a hot, dry area of southern Saskatchewan. You can sit in the car and wait for help or walk 2 miles to a service station. Since temperatures in the car are approaching 65°C , you decide to walk. Which items of clothing would keep you the coolest? Pick one from each set.

- a. a black shirt or a white shirt
- b. light jeans or dark jeans
- c. a black cowboy hat or a white cowboy hat



Return to page 63 of the Student Module Booklet and begin the Section 2 Review.

31

Section 3 Assignment: Simple Machines and Energy Transfer

Read all parts of your assignment carefully and record your answers in the appropriate places.

For questions 1 to 7, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

1

_____ 1. The unit of measure used to record the amount of work done is the

- A. newton
- B. metre
- C. newton-metre
- D. kilogram

1

_____ 2. Sue and her brother Allan are trying to play on a teeter-totter. Allan is having trouble because he is so much lighter than his sister. Which diagram shows where Allan and Sue should sit to make this work out best?

A. Sue

Allan



B. Sue

Allan



C.

Sue

Allan



D.

Sue

Allan



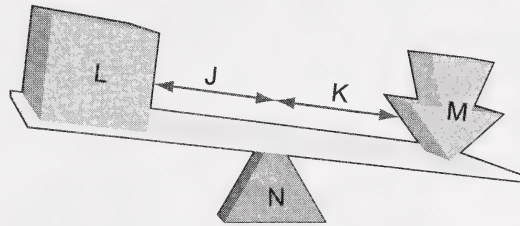
- ① _____ 3. Two components of work are
- A. force and energy
 - B. time and force
 - C. force and distance
 - D. length and distance
- ① _____ 4. Work is defined as
- A. a distance
 - B. a push or a pull
 - C. a force against an object
 - D. a force applied over a distance
- ① _____ 5. A force of 20 N is required to lift a box. The box is lifted from the floor to a shelf that is 2 m high. The amount of work done is
- A. 2 N•m
 - B. 10 N•m
 - C. 20 N•m
 - D. 40 N•m
- ① _____ 6. Paula does 8000 J of work pushing a wheelbarrow to her garden. If the distance she moved the wheelbarrow is 25 m, what force did she use to move the wheelbarrow?
- A. 80 N
 - B. 320 N
 - C. 8000 N
 - D. 200 000 N
- ① _____ 7. You push on a 1000-N object and it doesn't move. The amount of work done is
- A. 0 J
 - B. 100 J
 - C. 1000 J
 - D. 10 000 J



Return to page 77 of the Student Module Booklet and begin Lesson 2.

For questions 8 to 17, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

Use the following diagram to answer questions 8 and 9.



①

_____ 8. The part of the level labelled J is the

- A. load
- B. effort
- C. fulcrum
- D. load distance

①

_____ 9. The effort is labelled

- A. J
- B. K
- C. L
- D. M

①

_____ 10. If you pry off the lid of a paint can, the fulcrum is

- A. the handle of the screwdriver
- B. the rim of the paint can
- C. the lid of the paint can
- D. the tip of the screwdriver

①

_____ 11. How is a second class lever different from a first class lever?

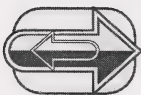
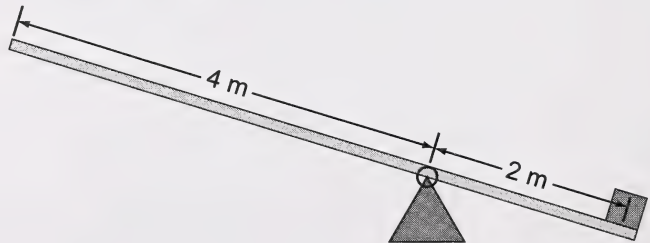
- A. The fulcrum is in the middle of a first class lever.
- B. The effort is at the end of a first class lever.
- C. The fulcrum is in the middle of a second class lever.
- D. There is no fulcrum in a second class lever.

①

_____ 12. What item is used as both a distance multiplier and a speed multiplier?

- A. nail puller
- B. wheelbarrow
- C. hockey stick
- D. forearm lifting an object

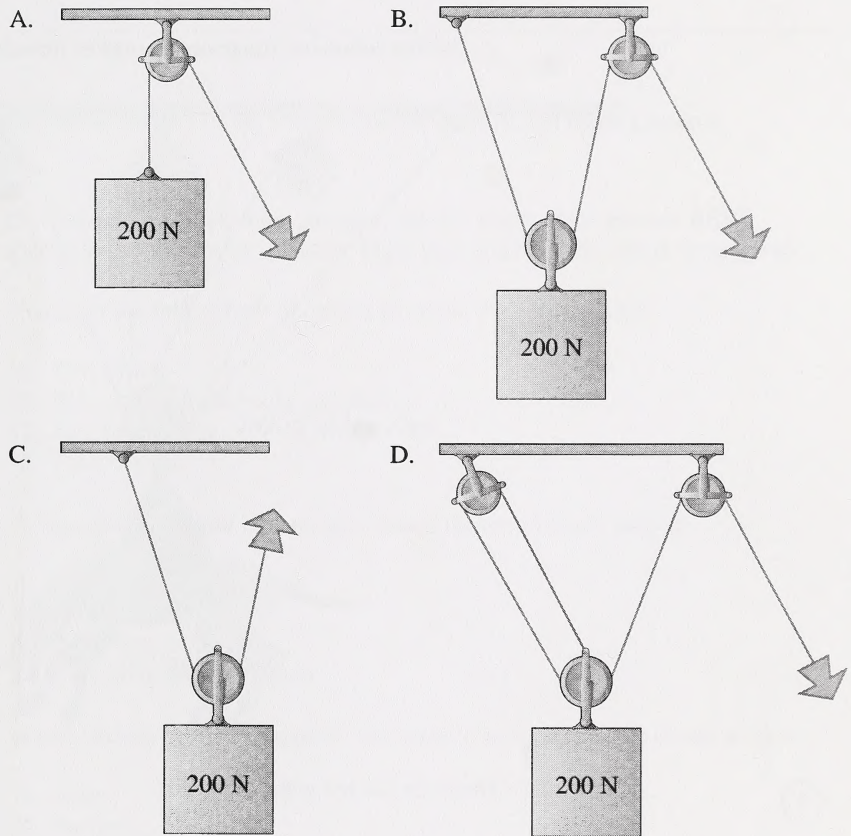
- ① _____ 13. What type of lever do biceps make when they contract to lift a load in the hand?
- A. first class
 - B. second class
 - C. third class
 - D. none of the above
- ① _____ 14. An example of a second class lever is a
- A. hammer
 - B. tennis racket
 - C. teeter-totter
 - D. wheelbarrow
- ① _____ 15. An example of a first class lever is a(n)
- A. fishing rod
 - B. tin snips
 - C. nutcracker
 - D. axe
- _____ 16. A force multiplier is a simple machine that
- A. puts a large force on the load with a small amount of effort
 - B. moves a load through a large distance
 - C. puts a small force on the load using a large amount of effort
 - D. puts a large force on the load with a large amount of effort
- ① _____ 17. The diagram shows a first class lever. How far down will the effort side have to move to lift the load 1 m?
- A. 0.5 m
 - B. 1 m
 - C. 2 m
 - D. 4 m



Return to page 84 of the Student Module Booklet and begin Lesson 3.

For questions 18 to 23, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

- ① _____ 18. Which diagram shows a set of pulleys that will let you lift a 200-N weight with at most 75 N of force?



- ① _____ 19. Which kind of machine is the volume knob on your home or car stereo?
- A. wedge
 - B. lever
 - C. incline plane
 - D. wheel and axle

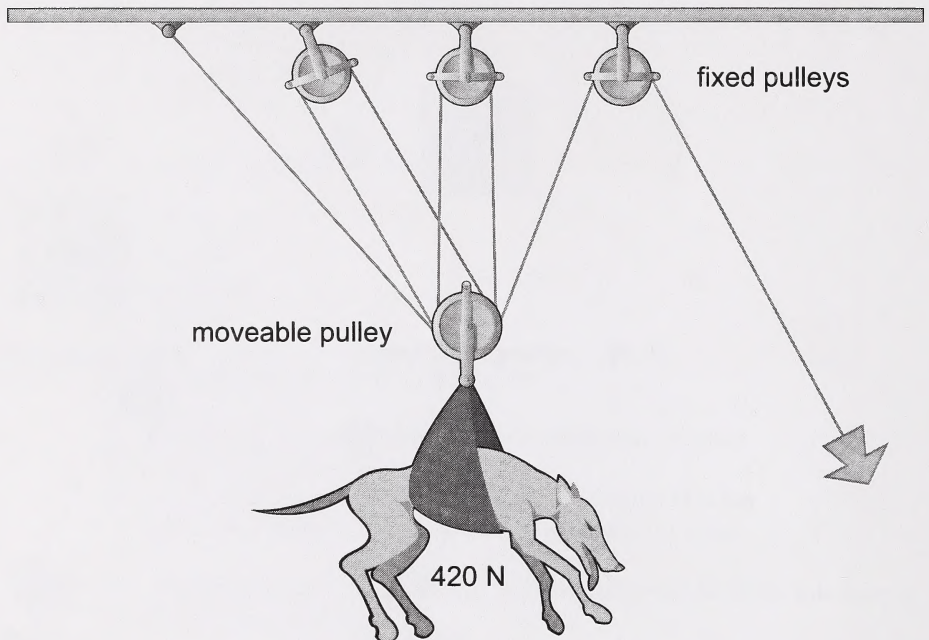
- ① _____ 20. A single fixed pulley will
- A. provide no advantage at all
 - B. only change the direction of the effort
 - C. require you to use an effort force that is half the load force
 - D. require you to use an effort force that is double the load force

①

_____ 21. Which item is not an example of a wheel and axle?

- A. wrench
- B. water faucet
- C. nail puller
- D. screwdriver

Use the following diagram to answer questions 22 and 23.



①

_____ 22. The force needed to lift the dog is

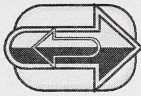
- A. 50 N
- B. 60 N
- C. 70 N
- D. 80 N

①

_____ 23. The dog was lifted 3 m into the air. How much rope was pulled to lift the dog this high?

- A. 0.5 m
- B. 3 m
- C. 6 m
- D. 18 m

- ③ 24. Alice is having trouble loosening a nut that holds her bicycle tire on. Why would a longer wrench help her?



Return to page 91 of the Student Module Booklet and begin Lesson 4.

For questions 25 to 29, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

- ① _____ 25. Which of the following will make a car more energy efficient?
- A. Drive faster.
 - B. Stop and start smoothly and slowly.
 - C. Idle excessively.
 - D. Paint the car.
- ① _____ 26. A way that would **not** help society reduce the use of fossil fuels is
- A. walk or bicycle more
 - B. drive more slowly
 - C. drive bigger cars
 - D. turn down the thermostats
- ① _____ 27. A comparison of work output of a machine to its energy use to do the work is
- A. force
 - B. energy
 - C. efficiency
 - D. work input
- ① _____ 28. The efficiency of a machine can be increased by
- A. making it go faster
 - B. increasing the fuel consumption
 - C. lubricating it to reduce friction
 - D. stopping it

①

_____ 29. A simple machine helps you by

- A. reducing the effort you need
- B. reducing the amount of work done
- C. increasing the amount of work done
- D. doing all the work for you



Submit your completed Assignment Booklet 2B to your teacher for assessment.
Then return to page 97 of the Student Module Booklet and begin the Section 3 Review.